AGENCY OVERVIEW

640 NDSU Main Research Center

Date: 12/23/2014
Time: 13:16:37

Statutory Authority
ND Constitution Article XIX; North Dakota Century Code Chapter 4-05.1.

Agency Description
The North Dakota State University Main Research Station is located on the campus of the North Dakota State University of Agriculture and Applied Science. The station is the administrative location of the North Dakota Agricultural Experiment Station. The station conducts research and coordinates all research activities of the Agricultural Experiment Station. The purpose of the research is the development and dissemination of technology important to the production and utilization of food, feed, fiber, and fuel from crop and livestock enterprises. The research provides for an enhancement of economic development, quality of life, sustainability of production, and protection of the environment. The Main Research Station keeps detailed records of all activities and publishes the information that will be of value to the residents of this state.

Agency Mission Statement
The agricultural experiment station shall develop and disseminate technology important to the production and utilization of food, feed, fiber, and fuel from crop and livestock enterprises. The research must provide for an enhancement of the quality of life, sustainability of production, and protection of the environment.

Agency Performance Measures
Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

Major Accomplishments
1. Continued breeding, disease and insect tests, fertility tests, responses to weed pressure, determination of desirable agronomic processing and products, and economic impacts for 14 major crops and several new crops.
2. Worked to develop an Unmanned Aircraft System test site in the state.The use of this technology has wide application possibilities within production agriculture in the state.
3. Investigated the impacts of oil and brine spills on soil and rangeland productivity and measured the impacts of dust from oilfield traffic. Development of pipelines alone impact over 10,000 acres annually in the state. Better recommendations on remediation strategies will bring this land back into production sooner and at higher productivity levels.
4. Realized at least a 0.5 ton/acre increase in seasonal forage yield with a fall alfalfa harvest management program developed at NDSU, which increased the crop value $86.0 million annually in ND.
5. Researched feeding behavior and feed efficiency in beef cattle indicates improvements in maternal nutrition to improve feed efficiency and reduce cow wintering costs. A 5 percent improvement in feed efficiency in states beef cows could result in a cost savings of over $14.0 million annually.
6. Worked to improve reproductive management. For every 1 percent improvement in pregnancy rate, the states beef cattle producers increase gross revenue by over $7.0 million annually.
7. Conducted critical research on the cause of disease affecting livestock in the state.
8. Conducted research to understand the causes of disease development and to improve the diagnosis and management of them. Host genetic resistance is the most economical and environmentally-safe way to control disease.
9. Studied runoff, evapotranspiration, soil moisture, and other parameters to enhance knowledge for profitable crop production while reducing the risk of water availability.
10. Used micro herbicide rates to control annual weeds, which has increased yields up to 42 percent and resulted in an increased income of $95.0 million dollars to growers.
11. Investigated the impact of sugarbeet root aphid.
12. Studied the economic feasibility of growing sugar beets as a biofuel feedstock.

AGENCY OVERVIEW

640 NDSU Main Research Center

Date: 12/23/2014
Time: 13:16:37

Future Critical Issues

The NDAES continues to focus on developing an infrastructure in which to do quality research. Shortfalls occur in laboratory research facilities, especially those for plant-based field research laboratories at the Main Station. Cereal and grain quality laboratories, critical to maintaining and enhancing quality parameters for new crop varieties, are in desperate need of renovation/replacement. Developing separate laboratories for quality evaluation of transgenic experimental breeding lines also is required, due to the separation of transgenic material required by Federal policies on transgenic material. Laboratory space at the Main Station needs to be renovated/enhanced in order to carry out both applied and fundamental research on crops and livestock. Disease evaluation by the Veterinary Diagnostic Lab is critical for our livestock industries to thrive, yet this facility is in jeopardy of losing accreditation due to its deteriorating condition. Similarly, the Meat Science laboratory, built in the 1950's and last renovated in 1970's is in very poor condition. A new facility is needed to allow our scientists to carry out cutting-edge research in meat quality, meat science, muscle quality and physiology. The new facilities, specifically the new agronomy labs at the RECs, as well as the AES greenhouse and the new animal research complex at the Main Station, have had strong positive impacts on the ability of NDAES scientists to carry out high quality research in these state-of-the-art facilities. New technologies in crop development will provide novel methodology to incorporate disease, insect, and environmental stress resistance, thereby improving the overall adaptation of our many crops grown in the state. Our scientists travel farther each year in the state to conduct site-specific research to control wheat and barley scab (an ongoing problem) and other important yield-limiting diseases of crop commodities grown in the state. Addressing new issues, such as wheat stem sawfly, new races of existing diseases for which these is little resistance, and identifying and responding to livestock producer concerns over outbreaks of zoonotic diseases are fundamental to the mission of the NDAES. Major problems occur in acquisition of costly field and laboratory equipment that cannot be obtained through grants. NDAES has insufficient laboratory space to meet the needs of 21st Century agriculture. North Dakota is becoming increasingly urban, and urban populations require some products and services that are different than those needed by livestock and crop producers. Continual efforts to improve horticultural research are occurring, and NDAES is actively evaluating new research and demonstration programs in this area. Enhanced efforts in areas including, but not limited to, food safety, food security, natural resources management, new bioproducts (including fuel) need to continue in order to allow NDAES to serve this segment of agriculture well. A systems approach for livestock research, literally from conception to consumption, is identifying ways to better serve this important sector of the North Dakota agriculture. Our strength is in our scientists and staff, but they are too few to cover all of the critical issues facing North Dakota agriculture, and the lack of adequate numbers precludes important scientific achievement. While we are proud to provide a high level of applied research that is readily transferred to our stakeholders, some areas of fundamental research have become important to improve the efficiencies of our plant and animal-based applied research. Genomics, bioinformatics, and epigenetics all have their basis in fundamental research, but they provide products and expertise to enhance plant breeding (through genomic selection, marker-based selection) and livestock genetics (evaluating environmental influences on genetic expression). For some units, additional technical support would significantly increase productivity of researchers. Scientists are responsible for attracting external funding, and their success during this biennium is impressive; however, the effort to write more, and larger, grants is apparent, and we have concern that significant research efforts at the Main Station and the RECs rely almost exclusively on extramural funding. Economic realities often place the NDAES in a position of responding rather than being proactive in affecting positive change. Our efforts to develop close collaborative relationships with industry and other scientific organizations will help allow the NDAES to become more proactive in solving problems critical to the state's largest industry.

Return to Report Guide

REQUEST SUMMARY

640 NDSU Main Research Center **Bill#: HB1020**

Biennium: 2015-2017

Date: 12/23/2014

Time: 13:16:37

Description	Expenditures 2011-2013 Biennium	Present Budget 2013-2015	Budget Request Change	Requested Budget 2015-2017 Biennium	Optional Budget Request
By Major Program					
Agricultural Research	107,191,420	111,660,237	40,201,081	151,861,318	430,000
Total Major Program	**107,191,420**	**111,660,237**	**40,201,081**	**151,861,318**	**430,000**
By Line Item					
Accrued Leave	0	2,561,394	(2,561,394)	0	0
Main Research Center	107,191,420	109,098,843	42,762,475	151,861,318	430,000
Total Line Items	**107,191,420**	**111,660,237**	**40,201,081**	**151,861,318**	**430,000**
By Funding Source					
General Fund	56,605,041	58,606,521	37,464,346	96,070,867	430,000
Federal Funds	6,547,697	5,931,138	1	5,931,139	0
Special Funds	44,038,682	47,122,578	2,736,734	49,859,312	0
Total Funding Source	**107,191,420**	**111,660,237**	**40,201,081**	**151,861,318**	**430,000**
Total FTE	**349.01**	**351.85**	**17.00**	**368.85**	**0.00**

Return to Report Guide

REQUEST DETAIL

640 NDSU Main Research Center **Bill#: HB1020**
Biennium: 2015-2017

Date: 12/23/2014
Time: 13:16:37

Description	Expenditures 2011-2013 Biennium	Present Budget 2013-2015	Budget Request Change	Requested Budget 2015-2017 Biennium	Optional Budget Request
Accrued Leave					
Salaries - Other	0	2,561,394	(2,561,394)	0	0
Total	**0**	**2,561,394**	**(2,561,394)**	**0**	**0**
Accrued Leave					
General Fund	0	1,748,140	(1,748,140)	0	0
Federal Funds	0	0	0	0	0
Special Funds	0	813,254	(813,254)	0	0
Total	**0**	**2,561,394**	**(2,561,394)**	**0**	**0**
Main Research Center					
Salaries - Permanent	46,803,014	49,581,434	(1,978,785)	47,602,649	0
Salaries - Other	24,027	29,980	(29,980)	0	0
Temporary Salaries	4,280,191	4,994,952	5,192,321	10,187,273	0
Overtime	375,039	396,923	1,593,078	1,990,001	0
Fringe Benefits	14,266,221	16,686,493	3,153,567	19,840,060	0
Travel	4,468,169	4,717,644	354,500	5,072,144	0
Supplies - IT Software	289,364	332,734	0	332,734	0
Supply/Material-Professional	4,436,939	4,728,869	709,000	5,437,869	0
Food and Clothing	171,111	93,162	0	93,162	0
Bldg, Ground, Maintenance	588,514	1,346,757	0	1,346,757	0
Miscellaneous Supplies	6,825,316	4,786,682	1,063,500	5,850,182	430,000
Office Supplies	135,282	150,892	0	150,892	0
Postage	50,471	46,734	0	46,734	0
Printing	231,809	249,330	0	249,330	0
IT Equip Under $5,000	337,224	377,609	0	377,609	0
Other Equip Under $5,000	666,327	729,955	709,000	1,438,955	0
Utilities	724,263	1,004,401	400,000	1,404,401	0
Insurance	160,389	160,138	0	160,138	0
Rentals/Leases-Equip & Other	604,173	509,305	0	509,305	0
Rentals/Leases - Bldg/Land	233,011	165,314	0	165,314	0
Repairs	1,787,155	1,606,645	0	1,606,645	0
IT - Communications	444,818	550,216	0	550,216	0
Professional Development	90,057	96,454	0	96,454	0
Operating Fees and Services	2,140,359	1,863,855	709,000	2,572,855	0
Fees - Professional Services	1,648,089	1,497,417	0	1,497,417	0
Medical, Dental and Optical	1,472	0	0	0	0
Miscellaneous Expenses	8,129	1,987	0	1,987	0
Interest Expense	0	1,135	0	1,135	0
Cost of Good Sold	80,115	1,289	0	1,289	0

Return to Report Guide

REQUEST DETAIL

640 NDSU Main Research Center **Bill#: HB1020**
Biennium: 2015-2017

Date: 12/23/2014
Time: 13:16:37

Description	Expenditures 2011-2013 Biennium	Present Budget 2013-2015	Budget Request Change	Requested Budget 2015-2017 Biennium	Optional Budget Request
Land and Buildings	10,817,247	5,925,000	26,908,796	32,833,796	0
Other Capital Payments	502,870	421,772	(203)	421,569	0
Extraordinary Repairs	0	1,340,465	1,440,465	2,780,930	0
Equipment Over $5000	3,995,227	4,703,300	2,538,216	7,241,516	0
IT Equip/Sftware Over $5000	5,028	0	0	0	0
Total	**107,191,420**	**109,098,843**	**42,762,475**	**151,861,318**	**430,000**
Main Research Center					
General Fund	56,605,041	56,858,381	39,212,486	96,070,867	430,000
Federal Funds	6,547,697	5,931,138	1	5,931,139	0
Special Funds	44,038,682	46,309,324	3,549,988	49,859,312	0
Total	**107,191,420**	**109,098,843**	**42,762,475**	**151,861,318**	**430,000**
Funding Sources					
General Fund	56,605,041	58,606,521	37,464,346	96,070,867	430,000
Federal Funds	6,547,697	5,931,138	1	5,931,139	0
Special Funds	44,038,682	47,122,578	2,736,734	49,859,312	0
Total Funding Sources	**107,191,420**	**111,660,237**	**40,201,081**	**151,861,318**	**430,000**

Return to Report Guide

CHANGE PACKAGE SUMMARY

640 NDSU Main Research Center **Bill#: HB1020**
Biennium: 2015-2017

Date: 12/23/2014
Time: 13:16:37

Description	Priority	FTE	General Fund	Federal Funds	Special Funds	Total Funds
Base Budget Changes						
One Time Budget Changes						
A-B 1 Major Capital Projects		0.00	31,633,796	0	0	31,633,796
A-B 2 One-time Requests		0.00	3,040,465	0	0	3,040,465
A-E 1 Remove 2013-15 One Time Funding		0.00	(400,000)	0	0	(400,000)
Total One Time Budget Changes		**0.00**	**34,274,261**	**0**	**0**	**34,274,261**
Ongoing Budget Changes						
A-A 1 SBARE Priorities		17.00	8,545,000	0	0	8,545,000
A-A 2 Base Funding Extraordinary Repairs		0.00	1,340,465	0	0	1,340,465
A-A 3 Base Funding for Equipment over $5,000		0.00	0	0	6,691,516	6,691,516
A-A 5 Capital Bond Payments		0.00	421,569	0	0	421,569
A-F 1 Remove 2013-15 Capital Projects		0.00	(5,925,000)	0	0	(5,925,000)
A-F 2 Remove Base Funding Extraord Repairs		0.00	(1,340,465)	0	0	(1,340,465)
A-F 3 Remove Base Funding Equip over $5,000		0.00	0	0	(4,303,300)	(4,303,300)
A-F 4 Remove Funding Cap Bond Pmts		0.00	(421,772)	0	0	(421,772)
Base Payroll Change		0.00	570,288	1	348,518	918,807
Total Ongoing Budget Changes		**17.00**	**3,190,085**	**1**	**2,736,734**	**5,926,820**
Total Base Budget Changes		**17.00**	**37,464,346**	**1**	**2,736,734**	**40,201,081**
Optional Budget Changes						
One Time Optional Changes						
A-D 100 Oil Patch Salary Differential		0.00	430,000	0	0	430,000
Total One Time Optional Changes		**0.00**	**430,000**	**0**	**0**	**430,000**
Total Optional Budget Changes		**0.00**	**430,000**	**0**	**0**	**430,000**

Return to Report Guide

BUDGET CHANGES NARRATIVE

640 NDSU Main Research Center **Bill#: HB1020** **Date:** 12/23/2014 **Time:** 13:16:37

Change Group: A	**Change Type:** A	**Change No:** 1	**Priority:**

SBARE Priorities

A base increase of $**8,545,000** would provide funds to address the following priorities of the State Board of Agricultural Research and Education and related needs of North Dakota agriculture. Main Station items noted below.

1. ***Bioinformatics***

$**1,200,000 Total General Fund Increase**

$1,200,00 salary and fringe benefits, 3.0 FTE – Main Station

Bioinformatics is the utilization of very large data sets generated by genetic analyses. Bioinformaticists utilize sophisticated computer programs to identify the appropriate genetic codes responsible for desired traits by analyzing extremely large data sets. This important task is a bridge from geneticists to plant breeders and other researchers, with the ultimate goals of enhancing the efficiencies of plant breeding programs, understanding the genetics of disease and insect pests, and increasing the knowledge base in animal genomics.

2. ***Precision Ag***

$**2,910,000 Total General Fund Increase**

$355,000 salary and fringe benefits, 2.0 FTE scientist and technician– Main Station (ABEN)

$2,555,000 increased funding for operating

Developing UAS-precision agricultural systems would offer agriculturalists in the state and nation increased opportunities to manage their resources for maximum profit. UAS technology, coupled with other precision Ag technologies such as GPS instrumentation, variable rate technology, fertilizer placement options, soil and crop sensors, complemented with ground-based research on the large number of crops grown in the state, will provide needed momentum for ND to become a leader in the field, given that ND was designated as a Federal test site.

3. ***Enhancing Research Infrastructure for greater research efficiencies and effectiveness***

$**1,900,000 Total General Fund Increase**

$800,000 Graduate student funding– Increase pool of funds for additional 20 graduate research assistantships. – Main Station

$1,100,000 Revolving Equipment Fund (REF)– Increase fund, make it annual instead of revolving. –Main Station and RECs

Graduate research assistantships are critical to ongoing, vibrant research programs. These students are hardworking, intelligent, and driven to succeed. They carry out research under the supervision of scientists at the Main Station and RECs, and these research topics broaden the overall research agenda of AES

projects. The students work for approved research programs in the AES, attend classes to improve their understanding of their respective disciplines, and also carry out their individual research topics. Access to a small pool of funding to increase the number of students in Agriculture has been very successful, not only in terms of enhancing research activities, but also by leveraging funds from other sources to increase the number of students. In 2011-13, the AES had funds for 20 students; departments and individual scientists were able to leverage these funds to increase the number of students to 36. Of these 36 students, 33 were from either the state (23) or region (10). Because of the strong Ag economy in ND, jobs are plentiful and many students will remain in the state upon graduation. This request is to provide funds for an additional 20 research assistantships.

The Revolving Equipment Funds for the RECs and Main Station have been very successful in allowing units to purchase expensive, but needed, equipment. The cost of field and laboratory equipment continues to increase – a small plot combine can exceed $300,000 and some specialized laboratory equipment can also exceed that price. Granting agencies assume that scientists have the equipment necessary to complete the work. Without the appropriate equipment, our scientists cannot be successful as they seek external funds to carry out their research programs. Increasing the REF for the RECs so that each REC will receive $150,000 each biennium rather than rotating across biennia will allow for more timely purchases and better planning of equipment purchases. Similarly, enhancing the Main Station REF by the same level to allocate funds to each unit every biennium will allow for better management and opportunities to leverage funds for the scientists that exist at the Main Station (allocation to units at Main Station is based on number of Scientist Years [SY] due to the varied size of Main Station units).

4. ***Risk and Trade***

$**420,000 Total General Fund Increase**

$160,000 salary and fringe benefits, 1.0 FTE research scientist – Center for Ag Policy and Trade Studies (CAPTS) -Main Station (ABAE)

$160,000 salary and fringe benefits, 1.0 FTE support staff – Risk Management -Main Station (ABAE)

$100,000 increased funding for operating

Center for Ag Policy and Trade Studies (CAPTS) -The Center is the premier agricultural policy center in the region, currently evaluates state, domestic, and international policies that affect demand-supply of grains and net farm income. Analyzing farm policy and providing timely information relevant to the state's agricultural industries have been important to crafting farm policies beneficial to the state and addressing issues to increase competition of ND agriculture.

Risk Management -Risk in agriculture has increased 3-4X since 1980 and will continue to grow in importance as a management strategy, given the wide fluctuations in yield, prices, input costs, availability of crop insurance, land costs, and food safety. With the mix of crop commodities in the state (and the importance of these commodities), the need to develop risk management strategies is critical. Commodity trading Room provides a research Lab for marketing information for farmers and outreach groups.

5. ***Enhancing Research Capacity at the RECs***

$1,270,000 Total General Fund Increase

$130,000 salary and fringe benefits, 1.0 FTE animal science technical support staff –HREC

$130,000 salary and fringe benefits, 1.0 FTE technical support staff (dust issues in western ND) –DREC

$260,000 salary and fringe benefits, 2.0 FTE technical support staff (livestock productivity and protection) – CREC, DREC

$330,000 salary and fringe benefits, 2.0 FTE scientist and technical support (plant pathologist for western ND) – WREC

$420,000 increased funding for operating; all 7 RECs

Hettinger REC (1.0 FTE, animal science technical support staff, HREC) The HREC is generally well equipped to carry out research activities on crop and livestock issues for southwest North Dakota. However, labor is limited on the animal science effort. The Center has a highly productive animal science research agenda, but the Director currently serves as the only animal scientist at the Center. Additional staffing is needed to help address the needs of the livestock industry and to offset the already high workload of the Center Director.

Dust issues in western ND (1.0 FTE, technical support staff, DREC)

Dust created by the extensive truck traffic servicing the oil industry in western ND has led to a number of cropping and livestock issues. These include, but are not limited to, reduced yields, inability/ unwillingness to harvest hay, and respiratory issues in livestock. The result is that dust is creating a negative effect on crop and livestock enterprises. Research to assist livestock and crop producers is necessary to identify ways to minimize this adverse effect on the agricultural industry in this region of the state.

Livestock Productivity and Protection (2.0 FTE technical support, CREC and DREC) North Dakota livestock producers are committed to producing the safest, highest quality food products possible. Increasing demand for our meat products nationally and internationally will require additional emphases on productivity and also will present additional opportunities for specialty markets. Through research, we can identify sustainable, profitable opportunities to improve livestock productivity in North Dakota.

Plant Pathologist for Western ND (2.0 FTE, scientist and technical support, WREC) There is an increasing level of crop disease problems occurring in western North Dakota due to changes in crop diversity, cropping systems, and crop rotation patterns. A plant pathologist is needed to evaluate and research crop diseases

and impacts under both dryland and irrigated, no-till, and continuous cropping systems in Northwest North Dakota. The closest plant pathologist to western ND is located at the Carrington REC.

6. ***Genetics and Genomics Initiative***

$**1,305,000 Total General Fund Increase**

$355,000 salary and fringe benefits, 2.0 FTE scientist and technician (epigenetics) –Main Station (Animal Sciences)

$355,000 salary and fringe benefits, 2.0 FTE scientist and support staff (statistical genomics) – Main Station (Plant Sciences)

$355,000 salary and fringe benefits, 2.0 FTE scientist and technical support staff (metagenomics) – Main Station (VMS)

$240,000 increased funding for operating

Epigenetics is the study of genetic expression modified by external environmental influences. Genetics of an organism codes the potential of the organism – the external environment affects the expression of many genes that influence final phenotypic expression of the organism (e.g., diet of the parents affecting carcass quality of the offspring). Understanding these external influences on gene expression may allow for enhanced benefits and profits to the livestock industry.

Statistical genomics uses statistical methodologies to determine genetic linkages and markers beneficial to crop improvement programs. Statistical genomics works with bioinformaticists to interpret the data to meaningful information for use by plant breeders and geneticists for desired traits.

Metagenomics is the method to study contributions the microbiome makes toward plant, animal, and soil health. It is the interaction of microbial genomics with plant and animal genomics, which may lead to greater efficiencies, less disease, and a greater understanding of epigenetic factors.

7. ***Livestock Research to enhance productivity and profitability***

$**710,000 Total General Fund Increase**

$355,000 salary and fringe benefits, 2.0 FTE scientist and technical support (microbiome initiative) –Main Station (Animal Sciences)

$355,000 salary and fringe benefits, 2.0 FTE scientist and technical support (forage nutrition) – Main Station (Animal Sciences)

Microbiome Initiative -The microbiome is the ecological community of commensal, pathogenic, and symbiotic microorganisms that impact livestock production. Animal scientists will study the role of the microbiome in nutrition, disease, and environmental impact and, ultimately, human health.

Forage Nutrition -Forage and hay represent the greatest amount of nutrition received by beef cattle in North Dakota. Differences in the nutritional quality of forages and hay affect growth, development, and productivity of individual animals, thereby affecting profitability of the livestock producer. Developing a program in forage nutrition can assist producers throughout the state on improving forage quality and potentially increase profitability. This will complement existing programs in forage management, nutrition management, and range management.

8. ***Food Safety/Global Institute for Food Security and International Agriculture***

$**500,000 Total General Fund Increase**

$500,000 increased funding for operating –Main Station

Food safety and security are identified as among the most significant topics globally. Each nation is concerned about food security – a food supply to nourish the citizens of a specific country, safe from environmental or created catastrophes, terrorism, and trade disputes. Similarly, food that is free from contamination and is safe to consume is critical to ensure the health of a country's citizens. Food Safety involves research collaboration across disciplines and Extension. The AES has several established food safety research collaborations and seeks to expand its capabilities to enhance the efforts of the new global institute.

9. ***Soil Health research support***

$**150,000 Total General Fund Increase**

$150,000 Increased operating to build upon the Soil Health Initiative supported in the 2011-13 Legislative Session –Main Station

The rise of the oil industry in western ND may have long-term impacts on land quality, which may reduce agricultural productivity. Brine spills and soil compaction have reduced land quality and crop productivity in western North Dakota.

Change Group: A	**Change Type:** A	**Change No:** 2	**Priority:**

Base Funding Extraordinary Repairs

BUDGET CHANGES NARRATIVE **Date:** 12/23/2014
640 NDSU Main Research Center **Bill#: HB1020** **Time:** 13:16:37

This provides an amount equal to the 2013-15 base funding of **$1,340,465** for extraordinary repairs, and is equivalent to the amount removed in the cost to continue **change code AF2**. A prioritized listing of extraordinary repair projects is included in the extraordinary repairs subschedule (because of OMB's requirement to do so), however these priorities can very easily change, due to unforeseen circumstances and emergencies. The priority listing is only a best estimate at this time. The actual use of these dollars will be left to the discretion of the research extension centers (with appropriate approvals by the SBHE where required). All NDUS entities will be given the authority to allocate dollars to repair and replacement priorities for both deferred maintenance and regular repair and replacement projects as determined by each entity.

Change Group: A	**Change Type:** A	**Change No:** 3	**Priority:**

Base Funding for Equipment over $5,000

This provides $6,691,516 for equipment > $5,000 for 2015-2017.

Change Group: A	**Change Type:** A	**Change No:** 5	**Priority:**

Capital Bond Payments

This **$421,569** request is based on 2015-17 estimates provided by the Industrial Commission for state general fund obligation bonds issued through the Industrial Commission. The 2013-15 appropriation for bond payments was removed in change code **AF4.**

Change Group: A	**Change Type:** B	**Change No:** 1	**Priority:**

Major Capital Projects

Further details pertaining to the 2015-17 major capital projects request, totaling **$31,633,796,** are included in the Capital Assets subschedule.

Unranked Capital Request:
Funding of $400,000 was appropriated by the sixty-third Legislative Assembly. Bids received for the project were significantly over budget. The amount requested is an estimate to complete the project as presented. The amount was calculated by the architectural firm that has been contracted for all agronomy lab construction projects that were funded this biennium.
Agronomy Lab CGREC
With the addition of a forage agronomist at the CGREC, the center is in need of a forage lab building. Currently samples collected in the field by the scientist are processed in a corner of an equipment storage building with a dirt floor. The dust from opening the overhead door and moving equipment renders this area very dusty and difficult to keep scales and computers clean. The new building would house the forage drying ovens, computer, scale etc. for sample data processing. It would also house the grinders and equipment to process the forage samples in preparation for nutrient analysis. - $783,796

Ranked Capital Requests:
1. Veterinary Diagnostic Lab replacement - Main Station
The NDAES Veterinary Diagnostic Lab (VDL) may lose accreditation because it does not meet modern laboratory standards. Loss of accreditation would affect North Dakota veterinarians and livestock producers relying on the facility for test results; would affect affiliation with the National Animal Health Laboratory Network (subsequently affecting funds for diagnostic equipment, proficiency testing for regulatory diseases, partial salary support for an IT position, and would prevent competition for surveillance testing contracts); would restrict access to Federal funds for bioterrorism preparedness and partial funding of technical support; inhibits the ability to conduct regulatory testing for animals crossing state and international borders; restricts surveillance of diseases of human health significance, such as rabies, anthrax, and West Nile virus; affects the ability of the VDL to participate in the Veterinary Laboratory Response network for toxicology testing. Veterinary clinics often require the use of

an accredited veterinary diagnostic lab for biopsies and bacterial culture. The loss of accreditation would result in significantly higher costs for animal health and regulatory testing for North Dakota livestock producers, veterinarians, and the public. The state would be unable to respond to animal health emergencies in a timely fashion.
A new and modern facility to house the veterinary diagnostic laboratory (VDL) at North Dakota State University should be a minimum of 20,000 square feet (current facility is approximately 8,000 square feet) and be designed to allow cost effective addition of laboratory space, as needed, to meet future testing demands (i.e. meat testing, analysis of feed and animal samples for petroleum residues, international export testing). The facility should include adequate laboratory and office space for sample receiving, toxicology, serology, information technology, administration, clinical pathology, gross pathology, histology, quality assurance, bacteriology/mycology, virology and molecular diagnostic sections. In addition, space to house a library and conference/meeting room that can accommodate presentations for producer groups, veterinary groups and student groups should be included. Since the future of carcass rendering is uncertain, it is necessary to install a tissue digester to insure safe and adequate carcass disposal capacity. A new VDL needs to have dedicated Biosafety Level 3 necropsy/laboratory space (including the ability to capture effluent) to safely address current and future public health threats and potential introductions of foreign animal diseases. This facility should have a biosecure visitor's entry with dedicated bathrooms. Adequate parking space, semi-truck and trailer access and a radiology room are needed. An enclosed receiving area that will allow for off-loading of animal carcasses, as well as live animals that may require euthanasia, is required. Appropriate storage for archiving records and data storage is necessary. Adequate freezer space for individual labs and lockup of samples involved in litigation cases is important. The post mortem laboratory should have access points that allow shower-in/ shower-out capability for personnel as well biosecure entry and exit points to safely contain animal and human pathogens. The entire building must be sufficiently secure with electronic card key access to individual laboratories. An alarm system including monitoring of major equipment, and a back-up power source are necessary as well. Building surveillance cameras are suggested. - $18,000,000

2. Meats Lab Facility – Main Station
A new/upgraded facility urgently needed. The current Meats Lab is approximately 7,500 sq. ft. and was built in the 1950's and no longer serves the needs of modern meat science research. Annual repair and maintenance costs to the current facility continue to increase. Additionally, the Lab continues to struggle to meet the U.S. Department of Agriculture inspection requirements for safe meat handling and processing. A new facility is necessary because opportunities to grow the state's livestock industries are tied to the knowledge of the end product and how that product meets the needs of national and international consumers. Design features of a 19,000 sq. ft. facility would include animal holding and handling areas, an abattoir, processing and fabrication rooms, research labs, walk-in coolers and freezers, sensory evaluation labs, preparation kitchens, conference rooms, and other miscellaneous support, storage, and equipment rooms. - $7,600,000
3. Seed Cleaning Facilities – CREC, LREC,
NCREC, WREC
Seed cleaning facilities at CREC, LREC, NCREC, and WREC need to be replaced. Current facilities are antiquated, lack reliable capability to ensure high quality seed, are slow, and inefficient. These facilities were designed to handle cereal crops and have limited/no capability of cleaning pulse crops and other fragile seed that are in high demand. Also, the existing facilities pose considerable worker safety issues. The request is for four portable mills and a storage facility for the mill when not in use. Each Center will have one mill, with appropriate air screen cleaner, indent mill and gravity mill, augers, conveyors, and cyclone dust cleaning system. The capacity would be approximately 300 bu/hr, depending on type of crop being cleaned. The facility will have the appropriate electrical, ventilation, and heating necessary for electric eye separators (at CREC, NCREC, and WREC) to ensure a high quality product - $5,250,000

Change Group: A	**Change Type:** B	**Change No:** 2	**Priority:**

One-time Requests

The Main REC is requesting one-time funds, totaling **$3,040,465**, for the following:

- **$1,440,465** for deferred maintenance

BUDGET CHANGES NARRATIVE **Date:** 12/23/2014
640 NDSU Main Research Center **Bill#: HB1020** **Time:** 13:16:37

Deferred maintenance funding continues to be an important issue. Updates and repairs to facilities that enhance worker safety and productivity are needed across the AES. The CGREC, specifically, has maintenance issues with all residences, barns, and office buildings. Similar issues exist at other centers, primarily with respect to facility updates and repairs. - $1,440,465

- **$1,200,000** to increase geothermal well capacity

Increase geothermal well capacity $1,200,000 – funding for the greenhouse construction allowed for a portion of geothermal wells to be installed – the system is working well, but additional well capacity is needed to heat/cool the headhouse building. It is estimated that 200 additional wells will be needed, given the high heating and cooling demand of the facility.

- **$400,000 for greenhouse utilities**

Utilities $400,000 – underestimated by architect. Need one-time funds to help offset prices – time to collect data on usage and cost for a formal permanent request in 2017.

Change Group: A	**Change Type:** D	**Change No:** 100	**Priority:**

Oil Patch Salary Differential

One time funds, totaling $**430,000,** are requested to address salary support in western North Dakota.

The oil industry on the infrastructure, salary, and cost of living in western North Dakota is having a wide and lasting impact on the state's western population and the state's workers residing in the area. This will provide salary support to aid in the retention and recruitment of Experiment Station employees at RECs located in oil-impacted counties, which are experiencing the pressure of high market competition and high housing costs.

Change Group: A	**Change Type:** E	**Change No:** 1	**Priority:**

Remove 2013-15 One Time Funding

To remove **$400,000** (GF) for vet diagnostic equipment (SB2020, Section 2).

Change Group: A	**Change Type:** F	**Change No:** 1	**Priority:**

Remove 2013-15 Capital Projects

To remove 2013-15 adjusted appropriation authority for the Agronomy Laboratories - **$5,925,000 GF**. We will report on the status of the individual projects to the appropriations committees of the sixty-third legislative assembly, as required.

Change Group: A	**Change Type:** F	**Change No:** 2	**Priority:**

Remove Base Funding Extraord Repairs

BUDGET CHANGES NARRATIVE **Date:** 12/23/2014
640 NDSU Main Research Center **Bill#: HB1020** **Time:** 13:16:37

To remove **$1,340,465** base funding for extraordinary repairs. The same amount is being requested for 2013-15, and is reflected in **change code AA2.** This funding was used for **(add narrative regarding the use of the funding to date.)**

Change Group: A	**Change Type:** F	**Change No:** 3	**Priority:**

Remove Base Funding Equip over $5,000

To remove **$4,303,300** base funding for equipment > $5,000. Amounts requested for 2015-17 are reflected in **change code AA3.**

Change Group: A	**Change Type:** F	**Change No:** 4	**Priority:**

Remove Funding Cap Bond Pmts

To remove **$421,772** for the 2013-15 bond payments for state general fund obligation bonds issued through the Industrial Commission. The 2015-17 bond payments are added in change code **AA5.**

Change Group: R	**Change Type:** A	**Change No:** 1	**Priority:**

Adjust SBARE Inititaves to Recommendation

This change package adjusts funding for SBARE initiatives in change package AA1 to the Executive Recommendation:

Bioinformatics

- $800,000 and 2.00 FTE for bioinformaticist. Did not recommend third bioinformaticist that was in request.

Precision Ag

- $455,000 and 2.00 FTE for a scientist and a technician. Did not recommend $2,455,000 increase in operating that would have been used for in-house competitive grants.

Enhancing Research Infrastructure

- $550,000 for increased funding for equipment.
- Did not fund the $800,000 for graduate student funding.

Livestock Initiative

- Did not fund $1,180,000 and 6.0 FTE requested for this initiative.

Risk and Trade

- Did not fund $420,000 and 2.00 FTE for this initiative.

BUDGET CHANGES NARRATIVE **Date:** 12/23/2014
640 NDSU Main Research Center **Bill#: HB1020** **Time:** 13:16:37

Genetics & Genomics Initiative

- Did not fund $1,305,000 and 6.00 FTE for this initiative

Livestock Research

- Did not fund $710,000 and 4.00 FTE for this initiative

Also, did not fund $500,000 for operating increases for the Food Safety/Global Institute for Food Security Initiative and $150,000 for the Soil Health Research support initiative.

Change Group: R	**Change Type:** B	**Change No:** 1	**Priority:**

Adjust one-time SBARE Initiatives to Recommendation

This change package adjusts the capital projects in change package AB2 to the Executive Recommendation:

- Provides $18,000,000 to construct a Veterinary Diagnostic Lab at the Main Station.
- Provides $783,796 to construct an agronomy laboratory at the Central Grasslands Research Center.
- Does not include funding of $7,600,000 requested for a meats lab facility.
- Does not include funding of $5.250,000 requested for seed cleaning facilities.
- Does not include funding of $1,440,465 requested for deferred maintenance.
- Does not include funding of $1,200,000 for an increase in geothermal well capacity.